SCIENCE DEPARTMENT ASSESSMENT REPORT
2006 CALENDAR YEAR

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Sources of Information:
• Assessment of Major – completed by instructors of BIOL/CHEM 490 – Senior Seminar
• Major Field Test – completed by all students taking BIOL/CHEM 490

Students Assessed: (undergraduate-biology, chemistry, forensic science)
• Spring 2006 – 26
• Fall 2006 – 13

Results of Assessment:
• Assessment of Major –
  o The majority of students are able to satisfactorily meet the Measurable Learning Outcomes.
  o One consistent area of weakness is the ability to ‘construct a bibliography using appropriate sources and format’.
  o Strengths of the degree programs:
    • Students have good technical knowledge.
    • Most students are able to effectively search the primary literature.
  o Observed weaknesses of the degree programs:
    • Lack of control over sequence in which students complete courses. Some students did not have the prerequisites for Senior Seminar.
    • Lack of understanding of difference between the process of research and the knowledge gained from the research.
    • Student science background is highly variable, especially with transfer students.
    • Overlap with material taught in Research Design.
  o Recommended strategies to improve content and instruction in programs:
    • Separate majors from non-majors in classes.
    • Emphasize applied statistics throughout coursework.
    • Be sure students complete basic courses before moving on to upper-level courses.
    • Emphasize the difference between the process of science and the knowledge it produces.
  o This was the first time teaching Senior Seminar for both instructors this year.

• Major Field Test - Biology
  o Areas of Strength – Cell biology, Animal biology, Evolution
  o Areas of Weakness – Biochemistry, Molecular biology
  o National Comparison – Overall, our students scored in the 30th percentile. This is a significant improvement over previous years when we averaged
in the 5-10th percentiles. Subscores in the areas of cell biology, genetics, organismal biology and ecology/evolution are variable within the two semesters reported. No single area appears to be particularly strong or weak. There were significant differences between individual students, but these probably reflect students' areas of concentration (human biology, general biology, forensic science).

- Chemistry – too few students took the Chemistry MFT to allow analysis.

Faculty Analysis of Results

- The MLO's of the culminating experience course are being met at a higher rate, probably because we have started requiring a research design course before students take senior seminar. However, the prerequisite was not consistently implemented and many students were less prepared for the learning objectives of this course.
- A continuing problem is that students do not take the MFT exam seriously because it has no effect on their grade or status. With the implementation of computerized testing and instant results, we hope to find a way to integrate MFT performance into the student's course grade.
- Another issue is the number of transfer students we receive. According to the MFT demographic reports, about 50% of our students have transferred to Columbia College from another institution. Anecdotally, we believe that many of these students are underprepared for our courses.
- An additional complicating factor is that Forensic Science students take the biology and chemistry MFT's. They have significant coursework in the sciences but do not have the breadth or depth of courses that biology and chemistry majors take.

Recommendations for improvement:

- Clarify the differences between Research Design and Senior Seminar to ensure that skills are progressively developed throughout the two courses and that there is little redundancy.
- Have one individual teach Senior Seminar for several consecutive years in order to develop a consistent pattern and content for the course.
- Implement a departmental seminar that will allow all students to be exposed to science process and knowledge throughout their academic career at Columbia College. Students in Research Design and Senior Seminar will make presentations to this group.
- Re-evaluate course sequencing to be sure that fundamental concepts are firmly established before students progress to upper-level courses. This should include a course in cell biology for all students (new CAP proposal).
- Emphasize critical thinking in all courses.
- Ask the Forensic Science program to develop a more appropriate Senior Seminar for their students rather than including them in the science class